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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/714,607	11/18/2003	Chan-Ho Park	1751-294.Con	2934
6449	7590	01/26/2006	EXAMINER	
ROTHWELL, FIGG, ERNST & MANBECK, P.C.			ROSE, KIESHA L	
1425 K STREET, N.W.			ART UNIT	
SUITE 800			PAPER NUMBER	
WASHINGTON, DC 20005			2822	

DATE MAILED: 01/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/714,607

Applicant(s)

PARK, CHAN-HO

Examiner

Kiesha L. Rose

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 18 November 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-3 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

This Office Action is in response to the amendment filed 18 November 2005.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chesebro et al. (U.S. Patent 4,519,128) in view of Baba (U.S. Patent 5,554,872).

Chesebro discloses a trench isolation device (Fig. 4) that contains a high concentration collector area of first conductivity type (12), a low concentration collector area of first conductivity type (14) formed on high concentration collector area, a base area of second conductivity type (18) formed on low concentration collector area and having a trench (36) which penetrates the low concentration collector area in a vertical direction at a junction termination, a high concentration emitter area of first conductivity type (28) formed on predetermined upper surface of the base area, an emitter electrode (54), a base electrode (60) and a collector electrode (56), where the trench is formed of an oxide. (Column 1, lines 20-22) Chesebro discloses all the limitations except for the trench having a depth of 50-100 micrometers. Whereas Baba discloses a semiconductor device (Figs. 5 and 6) that contains a trench with a depth of 50-150

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micrometers and has a breakdown voltage of 500V. (Column 2, lines 30-42, column 8, lines 21-30) Since as stated in the applicant's specification that if the breakdown voltage is 500V-2000V then the depth of the trench must be 50-200 micrometers, therefore the trench must have a depth of 50-150 micrometers as claimed. The device has a trench of 50-200 micrometers and a voltage of 500V to produce a high breakdown voltage device. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device of Chesebro by incorporating a semiconductor device with a trench with a depth of 50-150 micrometers with a breakdown voltage of 500V to produce a high breakdown voltage device as taught by Baba. Chesebro and Baba disclose the claimed invention except for the width of the trench being 1/10 the depth of the trench. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the width of the trench to be 1/10 the depth of the trench, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (1980)

### ***Response to Arguments***

Applicant's arguments filed 18 November 2005 have been fully considered but they are not persuasive. Applicants argue that the Baba reference does not disclose the trench having a depth of 50-150 microns, this is erroneous since the Baba reference discloses that the depth of the trench **could** be 30 microns or more therefore a trench can be formed with the desired depth. In addition as stated in the specification of the present

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invention it states that for the breakdown voltage to be 500V-2000V then the depth of the trench must be 50-100 microns. (Page 5, Paragraph 20) Therefore since the Baba reference discloses that breakdown voltage claimed then the trench depth would be between the claimed ranges. Therefore the rejection stands.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

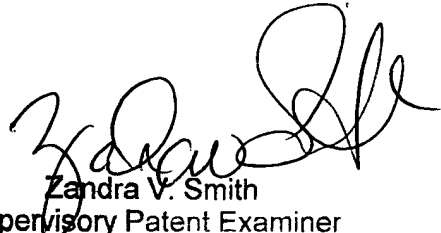
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kiesha L. Rose whose telephone number is 571-272-1844. The examiner can normally be reached on T-F 8:30-6:00 off Mondays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on 571-272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KR  
KLR

  
Zandra V. Smith  
Supervisory Patent Examiner  
23 Jan. 2006